Electronic structure of strongly disordered systems from ARPES

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Angular resolved photoemission has become a standard tool to map out the electronic band dispersion and to characterize many body interactions in crystalline solids. Since the method is momentum space based, its application is commonly restricted to systems with translational invariance. In this talk, it will be shown that valuable information can be extracted from ARPES data even for systems with strong structural disorder. To this end, two examples will be discussed: i) the modification of free electron like surface states in 1D step lattices, which are characterized by unusually large thermal fluctuations, and ii) the electronic structure of a 2D liquid metal. Despite the strict break down of the band-structure concept in liquids we clearly observe band-like features in the spectral function upon melting of a monolayer of Pb, which allows for a direct quantification of the coherence length of electronic states in the liquid phase.